

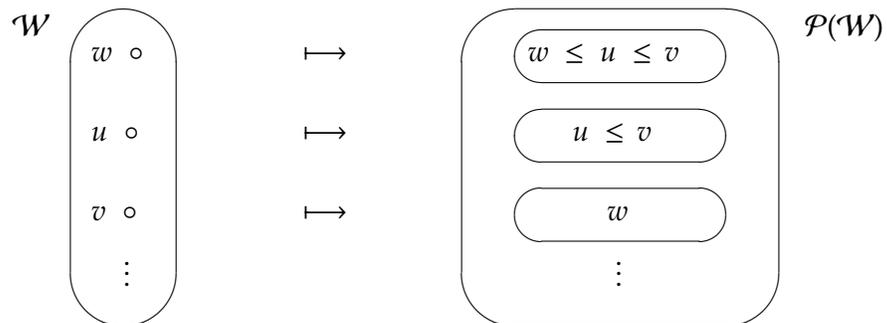
Modals as Distributive Indefinites

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1 Modals à la Kratzer

- Modals are sentential operators that quantify over possible worlds, along **3 dimensions**.
- The set of possible worlds available for quantification is *contextually* determined – the set of logically possible worlds W is restricted by a modal base which is determined by the conversational background.
- Two parameters are determined by the conversational background:
 1. **Modal base B** : the set of accessible worlds the modal quantifies over
 A function that assigns each world in W a set of worlds from the power set of W .
 $B : W \mapsto \mathcal{P}(W)$
 - (a) In worlds where the law holds (deontic)
 - (b) In worlds where what we know holds true (epistemic)
 - (c) In worlds where certain physical laws hold (circumstantial)
 - (d) In worlds where desires obtain (bouletic)
 2. **Ordering source**: stereotypical ranking \leq of possible worlds (induces a partial order)



- Modals have **quantificational/modal force**: *necessity, possibility*. \Box and \Diamond corresp. to \forall and \exists
- A proposition p is a **necessity** in a world w wrt a modal base B and an ordering source g iff the following condition is satisfied: For all $u \in \cap B(w)$ there is a $v \in \cap B(w)$ s.t. $v \leq_{g(w)} u$ and for all $z \in \cap B(w)$: if $z \leq_{g(w)} v$, then $z \in p$.
- Given that there are idiosyncratic restrictions on what modal force a modal carries in English, might lexically encode modal force into specification of modal.

2 Rullman et al

Basic aim:

- To extend a roughly Kratzerian view of modality to cover St'at'imcets data

Central claims:

- St'at'imcets differs from English in that the modal base doesn't vary with context. Rather, the modal base in St'at'imcets is lexically fixed and the quantificational force varies with context.
- A contextually variable choice function f , restricts the modal base $B(w)$, picking out different sizes of the set: $f : B(w) \mapsto \mathcal{P}(B(w))$
- All St'at'imcets possibility modals are specified with universal force by default (where f is the identity function, returning $B(w)$). Existential force is achieved via a pragmatic mechanism of weakening.
- Languages differ along two dimensions: (i) whether modal base is lexically or contextually determined, and (ii) whether the modal force is lexically or contextually determined.

(1) Modal schema:

$\llbracket \text{MODAL}(f)(B)(w)(\phi) \rrbracket = 1$ iff $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$, where

- f is a choice function that restricts the modal base B
- w is the possible world at which the expression $\text{MODAL}(\phi)$ is evaluated
- ϕ is a sentence of the language

	Modal Base	Ordering source	Modal force	Language
Kratzer	C	C	L	<i>English, German</i>
Rullman et al	L	??	C	<i>St'at'imcets</i>

Table 1: Kratzer and Rullman et al compared.

2.1 St'at'imcets modals

		modal base	quantificational/modal force	
			universal	existential
modal	kelh	future	✓	✓
	ka	deontic	✓	✓
		irrealis	✓	✓
evidential	k'a	epistemic–inferential	✓	✓
	an'	epistemic–perceived	✓	?
	ku7	epistemic–reportative	?	?

Table 2: St'at'imcets modals and evidentials

2.1.1 Future *kelh*

- only has a future reading; does not allow dispositional, epistemic or non-future readings

(2) *Context: Someone phones wanting to talk to your nephew and you tell them ‘He went to bed half an hour ago; he’ll be asleep by now.’*

plan k’a sáq’ulh hour kw s-nas-ts tu7 kíts-lec; plan **kelh** wa7 guy’t
 already INFER half hour DET NOM-go-3POSS then lie-AUT already FUT IMPF sleep

‘He already went to bed half an hour ago; he will [future] already be asleep.’

- variable quantificational force

(3) “the speaker is trying to persuade someone to come along by offering to do all the work; a claim that she *might* possibly do it would be inappropriate for the goal of persuasion” (p.11)

o, xílh-ts-kan **kelh** áti7, nilh t’u7 s-lh-nás-acw í7wa7
 oh do-CAUS-1SG.SUBJ FUT DEIC FOC just NOM-HYP-go-2SG.CONJ accompany

‘Oh, I’ll do it, if you come along.’

(4) ka-guy’t-kán-a **kelh** lh-q’em-ens-án ts7a ku pels, lh-cw7áoz-as
 OOC-sleep-1SG.SUBJ-OOC FUT HYP-SWALLOW-DIR-1SG.CONJ DEIC DET pill HYP-NEG-3CONJ
 kw-en-s ka-gúy’t-a, q’em-ens-kán kelh ku p’a7cw kw s-cwéscwest
 DET-1SG.POSS-NOM OOC-sleep-OOC SWALLOW-DIR-1SG.SUBJ FUT DET more DET NOM-strong
 ‘I might be able to sleep if I take this pill; if I can’t, I’ll take a stronger one.’

- **Semantics of *kelh***

$\llbracket \text{kelh}(f)(B)(w)(t)(\phi) \rrbracket$ is only defined if B is a circumstantial modal base and f is a choice function of type $\langle \langle s, t \rangle, \langle st \rangle \rangle$ such that $f(B(w, t)) \subseteq B(w, t)$.

If defined, $\llbracket \text{kelh}(f)(B)(w)(t)(\phi) \rrbracket = 1$ iff $\exists t' > t : \forall w \in f(B(w, t)) : \llbracket \phi(w')(t') \rrbracket = 1$

- **nb.** if f selects a proper subset of $B(w, t)$, it may be that the $w_0 \notin f(B(w, t))$, in which case *kelh* ϕ does not entail that ϕ will be true in the actual world, but only *might* be

2.1.2 Inferential *k'a*

- “requires that the source of evidence be indirect, and that there be some inference involved, either based on observed evidence, or on reasoning” (p.5)
 - they provide no negative examples to show that *k'a* cannot be used with a non-epistemic conversational background
- variable quantificational force

(5) *Context: Jim Hoffmann thought he saw a sasquatch and came running back with huge terrified eyes.*

ka-q'us-tum'-á **k'a** wi7
 OOC-frighten-PASS-OOC **INFER** EMPH

'It really must have frightened him!'

(6) *Context: There is some evidence that John has left, e.g. his bag has gone, but maybe he just took his bag to the bathroom.*

qwatsáts **k'a** tu7 k John, t'u7 wa7 k'a sxek k-wa-s cw7aoz t'u7
 leave **INFER** then DET John but IMPF INFER maybe DET-IMPF-3POSS NEG just
 k-wa-s qwatsáts
 DET-IMPF-3POSS leave

'John may have left, but maybe he hasn't left yet.'

- **Semantics of *k'a***

$\llbracket k'a(f)(B)(w)(\phi) \rrbracket$ is only defined if B is a epistemic modal base and f is a choice function of type $\langle\langle s, t \rangle, \langle s, t \rangle\rangle$ such that $f(B(w)) \subseteq B(w)$.

If defined, $\llbracket k'a(f)(B)(w)(\phi) \rrbracket = 1$ iff $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$

- evidence that the restriction on the modal base is a presupposition

(7) *projects through negation – not part of the assertion*

aoz **k'a** k-wa-s Sylvia ku xílh-tal'i
 NEG **INFER** DET-IMPF-3POSS Sylvia DET do(CAUS)-TOP

= '[I have indirect evidence that] It wasn't Sylvia who did it.'

≠ 'It is not the case that I have indirect evidence that Sylvia did it.'

(8) *not cancelable – not an implicature*

* ts'um'-qs-án'-as **k'a** kw s-Lémya7 kw s-Roger; ats'x-en-lhkán wi7 zam'
 lick-nose-DIR-3ERG **INFER** DET NOM-L. DET NOM-Roger see-DIR-1SG.SUBJ EMPH after.all

'Lémya7 must have kissed Roger; actually I saw it.'

Consultant's comment: "You're guessing but you're saying you saw it."

2.1.3 Deontic *ka*

- “the primary means in the language of expressing . . . ‘obligation/expectancy’ ” (p.12)
- cannot have, say, an epistemic reading (*cf.* English *must/could*)

(9) nilh **k’a/*ka** kw s-Mary ku kuk-un’-táli
 FOC **INFER/*KA** DET NOM-Mary DET COOK-DIR-TOP
 ‘Mary could have cooked this.’ (It tastes like her cooking.)

- variable quantificational force

(10) *Context: I don’t remember if we ate the rabbits or not.*

t’u7 wa7 **ka** n-scwákwekw-a ts’áqw-an’-em nilh s-pápt-s-a wa7
 but IMPF **DEON** 1SG.POSS-heart-DET eat-DIR-1PL.ERG FOC NOM-always-3POSS-DET IMPF
 tecwecw-wít lh-as kwís-alt i sqweyíts-a
 increase-3PL HYP-3CONJ fall-child DET.PL rabbit-DET

‘But I think we had to eat them because they were always having babies.’

nb. “An existential interpretation (*i.e.*, ‘I think we *could* eat them because they were always having babies’) would not make sense in the context; the speaker’s family ate several other kinds of farm animals which are not prolific breeders.” (p.12)

(11) *Context: You are going for a job interview and the receptionist outside the office tells you that you can leave your bag there, but you can also take it with you when you go in.*

lhwal-en-lhkácw **ka** lts7a tu wa7 s-zácen-su; kwán-lhkacw
 leave-DIR-2SG.SUBJ **DEON** DEIC DET IMPF NOM-carry-2SG.POSS take(DIR)-2SG.SUBJ
 lh-xát’-min’-acw
 HYP-want-RED-2SG.CONJ

‘You can leave your stuff here; take it if you want to.’

- **Semantics of deontic *ka***

$\llbracket ka(f)(B)(w)(\phi) \rrbracket$ is only defined if B is a deontic modal base and f is a choice function of type $\langle\langle s, t \rangle, \langle s, t \rangle\rangle$ such that $f(B(w)) \subseteq B(w)$.

If defined, $\llbracket ka(f)(B)(w)(\phi) \rrbracket = 1$ iff $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$

2.1.4 Irrealis *ka*

- occurs in counterfactual environments, parallel to English *would/could*
 - cannot have, say, an epistemic reading (see example (9) above)
- variable quantificational force

(12) lháxw-kacw **ka** lh-q’em-ens-ácw tákem i meláomen-sw-a . . .
 heal-2SG.SUBJ **IRR** HYP-SWALLOW-DIR-2SG.CONJ all DET.PL medicine-2SG.POSS-DET
 ‘If you took your medicine, you might/would get better . . .’

- a. kán-as kelh kw s-ka-7áma-sw-a
 YNQ-3CONJ FUT DET NOM-OOC-good-2SG.POSS-OOC
 ‘I don’t know if you’ll get well or not.’
- b. tsun-tsi-lhkán tu7
 say(DIR)-2SG.OBJ-1SG.SUBJ then
 ‘I told you it / I promise.’

• **Semantics of irrealis *ka***

because of its complicated interaction with the semantics of conditionals, counterfactuality and tense, Rullmann et al. only provide a sketch

- variability in quantificational force is again modeled by a choice function over the modal base
- the tricky part is to specify the restriction on the modal base
- **future** conditionals:
 - * a *stereotypical* modal base (“worlds that up to evaluation time *t* have the same history as the actual world *w*, and that after *t* develop in accordance with normal expectations”)
 - * a presupposition that the clause *ka* modifies is false at a future reference time
- **past** conditionals:
 - * presumably a modal base containing worlds whose histories resemble the actual world before some past reference time *t*, but whose histories may diverge from the actual world after time *t*
 - * a presupposition that the clause *ka* modifies is *false* at *t* in the actual world (but presumably true at *t* in the counterfactual worlds)

2.2 Cross-linguistic considerations

2.2.1 Revision of English

English modals are just like ST’ modals except that one class of English modals—the ‘strong’ modals—lexically specify *f* as the identity function.

- English weak modals are just like (all) ST’ modals; they do not presuppose the identity function, or any other value, as the value of *f*.
- Unlike ST’ modals, English existential modals cannot be used in situations where a universal is appropriate.
- English ‘strong’ modals presuppose the identity function as the value of *f*.

(13) **English ‘strong’ modals**

$\llbracket \text{MODAL}(f)(B)(w)(\phi) \rrbracket$ is only defined if $\forall A, f(A) = A$.

If defined, $\llbracket \text{MODAL}(f)(B)(w)(\phi) \rrbracket = 1$ iff $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$

- This allows for arrangement on a Horn scale with their weak counterparts:

(14) **Horn scale for English modals**

Strong	≧	Weak
must	>	may
will	>	might
would	>	could
		⋮

- Weak modals are pragmatically coerced into existential readings via Maxim of Quantity. This is the source of the (apparent) differences in quantificational force among English modals.
- Evidence that weak readings arise through conversational implicature comes from ability to explicitly cancel the implicature:

- (15) a. He could have gone – in fact, he must have gone (∀ ⇒ ∃)
 b. He can go – in fact, he should go (∀ ⇒ ∃)

2.2.2 ST' and English compared

- Two dimensions
 1. English partially specifies quantificational force; is liberal with respect to choice of modal base.
 2. ST' makes fine-grained distinctions between different modal bases; does not specify quantificational force.

	selective modal base	unselective modal base
specified force	?	English
unspecified force	St'at'imcets	?

Table 3: ST' and English

- Possible inverse correlation between specification of two parameters?
- Further cross-linguistic evidence needed.
- Possible candidates for specified force + selective modal base: English *maybe*, Farsi modal verbs?

3 Points for Discussion and questions

- How convincing is the data?
- Contribution of choice function mechanism to analysis? Comparative (dis)advantages with using ordering source?
- Why should identity function be preferred?

4 St'at'imcets evidentials

4.1 Perceived evidence *-an'*

- whereas *k'a* does not specify whether one's inference is based on observable results or just reasoning, *-an'* is only felicitous when the inference is based on perceptual evidence

(16) *Context: You had five pieces of ts'wan (wind-dried salmon) left when you checked yesterday. Today, you go to get some ts'wan to make soup and you notice they are all gone. You are not sure who took them, but you know that John is the person in your household who really loves ts'wan and usually eats lots whenever he gets a chance.*

a. ts'aqw-an'-ás k'a i ts'wán-a kw s-John
 eat-DIR-3ERG INFER DET.PL wind-dried.salmon-DET DET NOM-John
 'John must have eaten the *ts'wan*.'

b. ?? ts'aqw-an'-ás-an' i ts'wán-a kw s-John
 eat-DIR-3ERG-PERC.EVID DET.PL wind-dried.salmon-DET DET NOM-John
 'John apparently ate the *ts'wan*.'

Consultant's comment re (b): "[It's good] if he has bits of *ts'wan* on his shirt."

- quantificational force
 - the examples that would most clearly show that an existential reading is possible are rejected by consultants
 - the acceptable example that the authors offer as evidence that the existential reading is possible is not very convincing
 - they conclude that, "although strong, the universal effect with *-an'* is still only a preference" (p.31) [← debatable!!]

(17) * qwatsats-as-án' tu7 kw s-John, t'u7 wa7 k'a sxek k-wa-s cw7aoz
 leave-3CONJ-PERC.EVID then DET NOM-J. but IMPF INFER maybe DET-IMPF-3POSS NEG
 t'u7 k-wa-s qwatsáts
 just DET-IMPF-3POSS leave

'John apparently left, but maybe he hasn't left.'

[Attempted meaning: There is some evidence that John has left, e.g. his bag has gone, but maybe he just took his bag to the bathroom.]

(18) *Context: you're not sure it was Dave who stole your ts'wan, but maybe it was.*

nílh-as-an' kw s-Dave ta naq'w-ens-táli-ha i
 FOC-3CONJ-PERC.EVID DET NOM-DAVE DET steal-DIR-TOP-DET DET.PL
 n-ts'wán-a
 1SG.POSS-wind.dried.salmon-DET

'It looks like it was Dave who stole my *ts'wan*.'

- **Semantics of *-an'***

$\llbracket -an'(f)(B)(w)(\phi) \rrbracket$ is only defined if for all worlds $w', w' \in B(w)$ iff the perceived evidence in w holds in w' , and f is a choice function of type $\langle st, st \rangle$ such that $f(B(w)) \subseteq B(w)$.

If defined, $\llbracket -an'(f)(B)(w)(\phi) \rrbracket = 1$ iff for $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$.

- as with inferential *k'a* (7)–(8), the restriction on the modal base is argued to be a presupposition because it is neither an implicature nor part of the assertion

4.1.1 Reportative *ku7*

- “*ku7* ϕ is felicitous whenever the speaker came to believe that ϕ is possibly or necessarily true based on a report from some other person” (p.28)

- no negatives examples to show that *ku7* does not have other readings (*i.e.* a non-epistemic-reportative conversational background)

- quantificational force

- the examples that are supposed to show universal force also seem compatible with an existential reading

- but the example used in a context that is supposed to elicit an unequivocally existential interpretation is not accepted by all speakers

(19) wa7 **ku7** aylh múta7 tq-álk'-en-as ta taxicab-a knáti7 táown-a
 IMPF **REPORT** then and touch-string-DIR-3ERG DET taxicab-DET DEIC TOWN-DET
 ‘[I was told] He [my father] also drove a taxicab around town.’

(20) *Context: There is a rumour going around that Roger was elected chief. Sometimes that kind of rumour is right, sometimes it's wrong. You really have no idea whether it's likely to be right or wrong. You tell me:*

% aw-an-ém **ku7** kw s-Roger ku cuz' kúkwpi7
 choose-DIR-PASS **REPORT** DET NOM-Roger DET going.to chief

‘[I was told] Roger was elected to be chief.’

- **Semantics of *ku7***

$\llbracket ku7(f)(B)(w)(\phi) \rrbracket$ is only defined if for all worlds $w', w' \in B(w)$ iff the reported evidence in w holds in w' , and f is a choice function of type $\langle st, st \rangle$ such that $f(B(w)) \subseteq B(w)$.

If defined, $\llbracket ku7(f)(B)(w)(\phi) \rrbracket = 1$ iff for $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$.

4.1.2 Inferential *k'a* (revised)

- $\llbracket k'a(f)(B)(w)(\phi) \rrbracket$ is only defined if for all worlds $w, w' \in B(w)$ iff the inferential evidence in w holds in w' , and f is a choice function of type $\langle \langle s, t \rangle, \langle s, t \rangle \rangle$ such that $f(B(w)) \subseteq B(w)$.

If defined, $\llbracket k'a(f)(B)(w)(\phi) \rrbracket = 1$ iff for $\forall w' \in f(B(w)) : \llbracket \phi(w') \rrbracket = 1$